

Drainage Report

Lewis Magnet School Addition, To Wichita, Sedgwick County, Kansas



October, 2010



516 S. Market
Wichita, Kansas 67202
(316) 264-0242

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Drainage Report

Lewis Magnet School Addition

Introduction

The subject property is located on the Southeast corner of 29th Street South and Osage Ave. The tract of land is approximately 6.75 acres and is zoned single-family SF-5, which is an acceptable zoning for schools. The site consists of a school building and playgrounds. The current proposed use of the land is to remove the existing school building and add a building, parking lots and other facilities.

Current Conditions

The site is in the City of Wichita. The site consists of a school building, a parking lot and play ground. There are two driveways to 29th street and one to Osage Ave. Most of the playground is covered with grass except some swing areas which are covered with sand. The property is fairly flat and drains towards southeast corner. The soils are of Type B with moderate runoff coefficients. The average slope of land is about 0.2 % towards southeast corner.

There are no signs of wetlands and the land is not in a floodplain. There is no any existing storm sewer system on 29th St and Osage nearby the property. Only nearby existing storm sewer system is on Exchange Street about 400' South of the property. The Ex. Storm sewer system on Exchange and 30th St. South consists of three inlets tying into a manhole with 30" RCP going out of it towards South.

The attached plat with topography shows existing features including contours, utilities, storm sewer and proposed easements.

Proposed Improvements

The proposed improvement consists of removing of an existing building, parking lots, sidewalks and new construction of a building, playground, parking lot and other facilities for school use. The entire site in developed condition will drain storm water into the existing storm sewer system on Exchange St. and 30th St south through extended 24" RCP as proposed drainage plan. Internal storm sewer pipes and inlets are used to collect the water from the site to detention pond on southeast corner. The existing and developed peak runoff calculations are attached on hydrological analysis. The Lewis Magnet School Addition in developed condition dictates 33.74 cfs where as the peak runoff in existing condition is 12.53 cfs. The peak runoff after the development will be handled through detention. The required detention will be achieved through a detention pond on southeast corner.

Best management practices for erosion control will include, seeding of disturbed areas, inlet protection at all inlets, silt fence where applicable, and installing other city approved measures. The erosion control plan is attached in Tab 3.

Drainage plan illustrates there is significant increased in runoff after development of this site. The attached calculations show the existing and developed peak runoffs, including assumed coefficients and conditions.

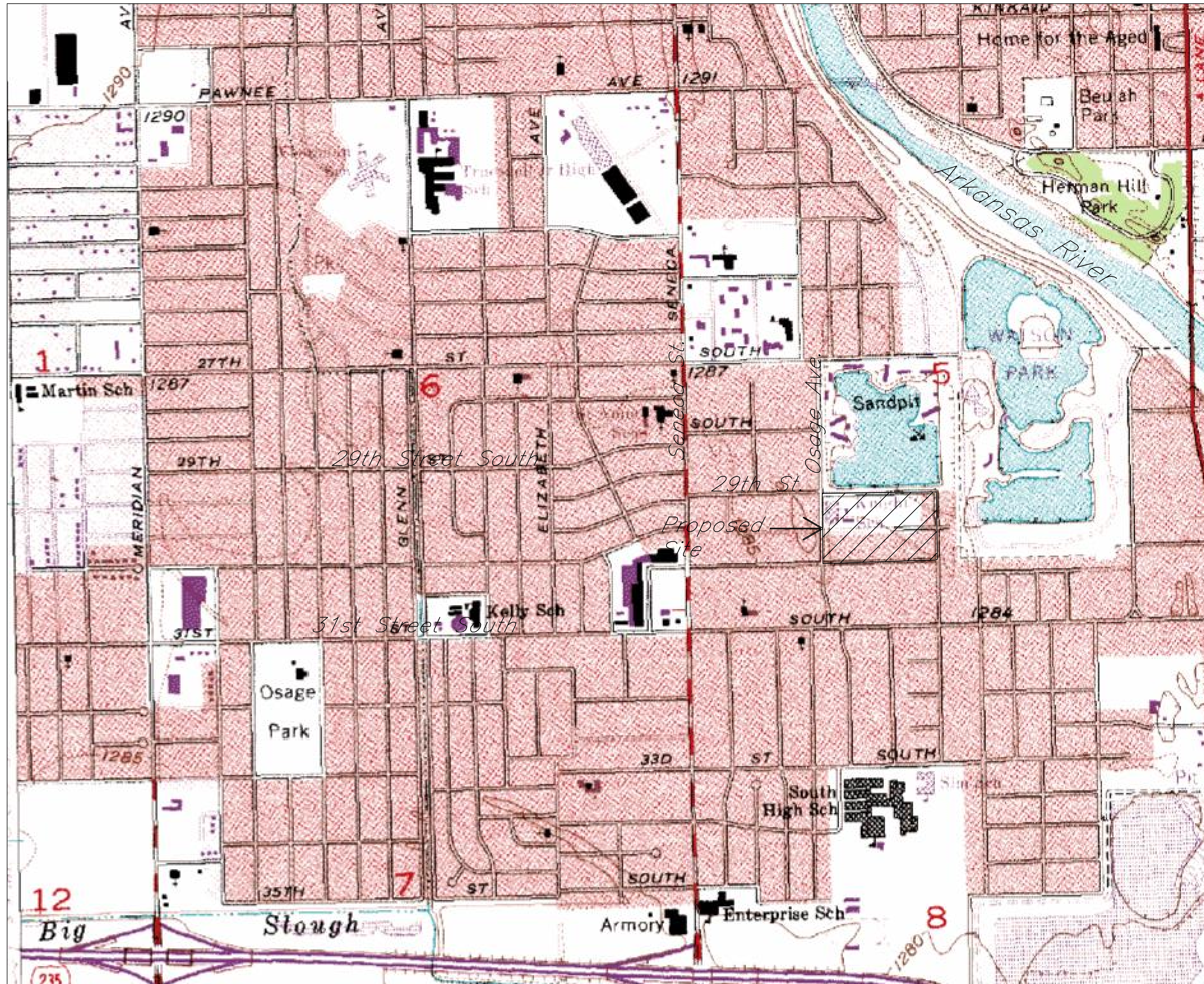
Site Hydrological Analysis

Existing and proposed site conditions have been modeled using the rational method. The Values for Rainfall Intensity and Runoff Coefficients were established using the *Drainage and Storm Sewer Policy for Design Criteria and Documentation, City of Wichita, Kansas*. Existing times of concentration were calculated from existing ground conditions and can be found in hydrological analysis section. Proposed times of concentration have been modeled using the proposed site runoff and accounting for the use of storm sewer pipes to route runoff from the area. A minimum time of concentration of 15 minutes was also considered as it is the minimum inlet time.

Future Development

There is construction of a new building, parking lots, sidewalks and driveways at this point. The site in future may have other school facilities added to it. The site will serve as school area.

USGS Map with Area Highlighted
Preliminary plat



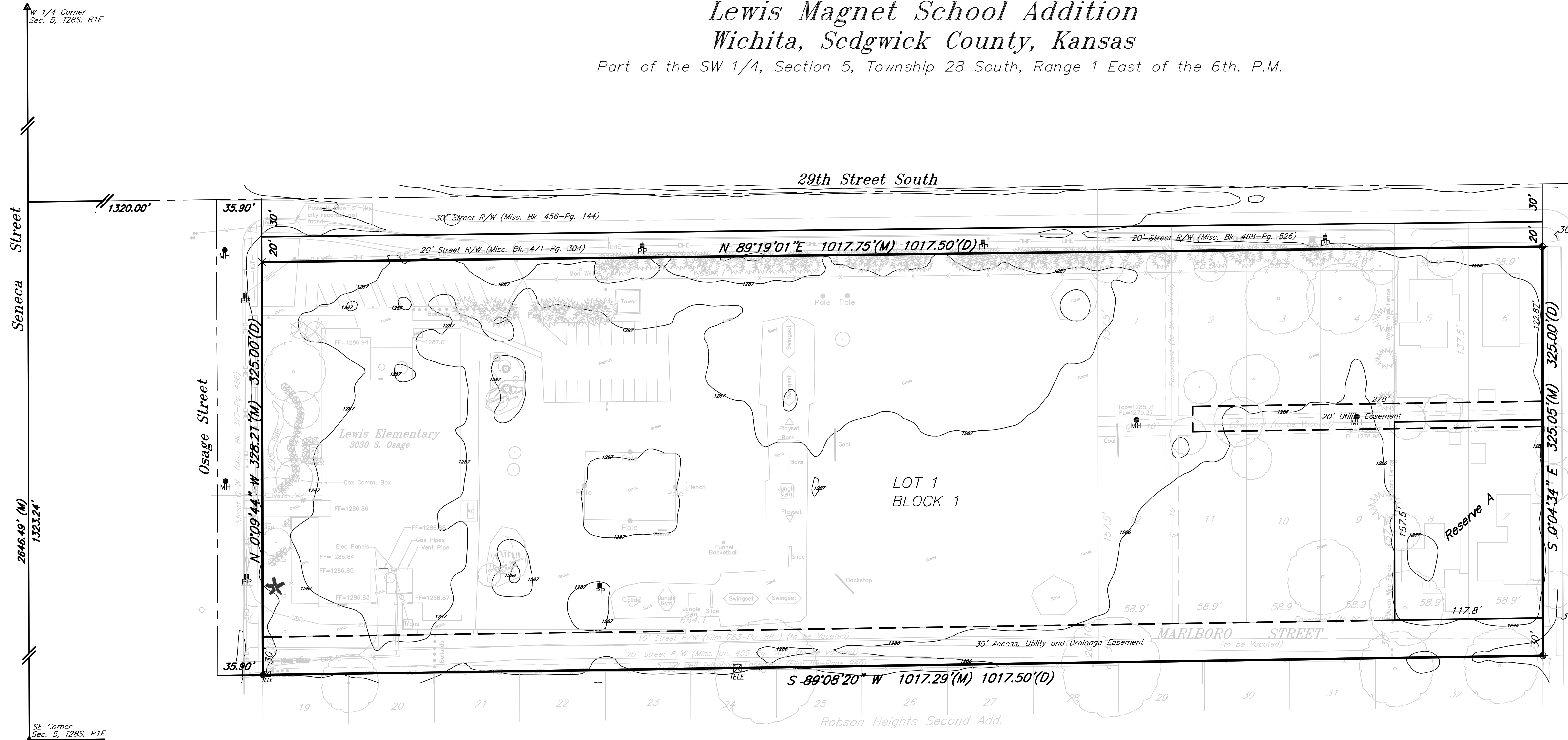
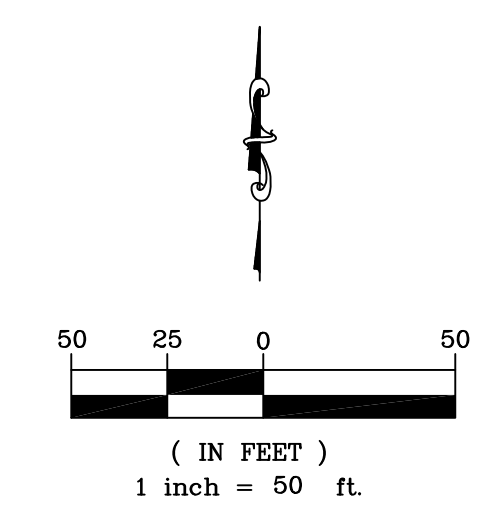
Lewis Magnet School Addition
 USGS Map
 Wichita, Kansas

	PROJECT NUMBER			
	KEM NO. 09148	FILE usgs	DATE 10/2010	SHEET 1
516 S. Market, Wichita, KS 67202	DESIGN GP	DRAWN GP	REVISED	OF 1

316/264-0242

One-Step Final Plat Lewis Magnet School Addition Wichita, Sedgwick County, Kansas

Part of the SW 1/4, Section 5, Township 28 South, Range 1 East of the 6th. P.M.



- LEGEND**
- Benchmark
 - Power Pole
 - Light Pole
 - Gas Valve
 - Fire Hydrant
 - Flag Pole
 - Water Valve
 - Water Meter
 - Sign
 - Cleanout
 - Cedar
 - Tree
 - Fence
 - Gas Line
 - Underground Electric
 - Overhead Electric
 - Underground Telephone
 - 1/2" Iron Pipe (found)
 - 5/8" Rebar (set) KEMPA CLS #157
 - (M) Measured
 - (D) Deeded

NOTES:
Utility locations are from USD 259 records and Kansas One-Call.

Benchmarks:
City of Wichita disc on the Southwest corner of traffic signal light pole base at the northeast corner of 31st Street South and Seneca.
Elevation=1283.22 NGVD 29

3/4" steel rod in curb @ east end of the southeast return at Osage and 29th Street South.
Elevation=1285.75 NGVD 29

State of Kansas }
County of Sedgwick } ss

I, Bradley C. Ward, a licensed land surveyor of the State of Kansas, do hereby certify that the following described tract of land was surveyed on the 12th day of November, 2009 and the accompanying final plat prepared and that all the monuments shown herein actually exist and their positions are correctly shown to the best of my knowledge and belief:

LEGAL DESCRIPTION

Beginning 80 rods East of the Northwest Corner of the South Half of the Southwest Quarter, thence South 375 feet; thence East 700 feet; thence North 375 feet; thence West to the Point of Beginning. EXCEPT: the West 35.9 feet dedicated as street right-of-way, of Section 5, Township 28 South, Range 1 East, of the Sixth Principal Meridian, Sedgwick County, Kansas.

AND:
Lots 1-12, Block 1, Gibbs First Addition, to Wichita, Kansas.

All easements and Rights of Way within said tract are hereby vacated by virtue of KSA 12-512(b) amended.

Bradley C. Ward, L.S. #920 _____ Date

State of Kansas }
County of Sedgwick } ss

Know all men by these presents, that we, the undersigned, have caused the land described in the surveyor's certificate to be platted into a Lot, Block and Reserve, to be known as Lewis Magnet School Addition, Wichita, Sedgwick County, Kansas. Any easements are hereby granted as indicated for constructing, maintaining, operating, and repairing public utilities. Reserve A is platted for drainage, utilities, landscaping and irrigation. A drainage plan has been developed for the plat and all drainage easements, rights-of-way, or reserves shall remain at established grades or as modified with the approval of the applicable City or County Engineer, and unobstructed to allow for the conveyance of stormwater. And further that the land contained herein is held and shall be conveyed subject to any applicable restrictions, reservations and covenants now on file or hereafter filed in the Office of the Register of Deeds of Sedgwick County, Kansas.

By: _____ Date
Connie Dietz, President
Unified School District #259

State of Kansas }
County of Sedgwick } ss

This instrument was acknowledged before me on this _____ day of _____, 2010, by _____

Connie Dietz, President
Unified School District #259

Notary Public
My Commission Expires: _____

State of Kansas }
City of Wichita } ss

This plat of Lewis Magnet School Addition, Wichita, Sedgwick County, Kansas, has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas. Dated this _____ day of _____, 2010. Wichita-Sedgwick County Metropolitan Area Planning Commission.

G. Nelson Van Fleet, Chair

John L. Schlegel, Secretary

State of Kansas }
City of Wichita } ss

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this _____ day of _____, 2010.

At the Direction of the City Council

Carl Brewer, Mayor

Karen Sublett, City Clerk

Entered on transfer record this _____ day of _____, 2010.

Kelly B. Arnold, County Clerk

State of Kansas }
County of Sedgwick } ss

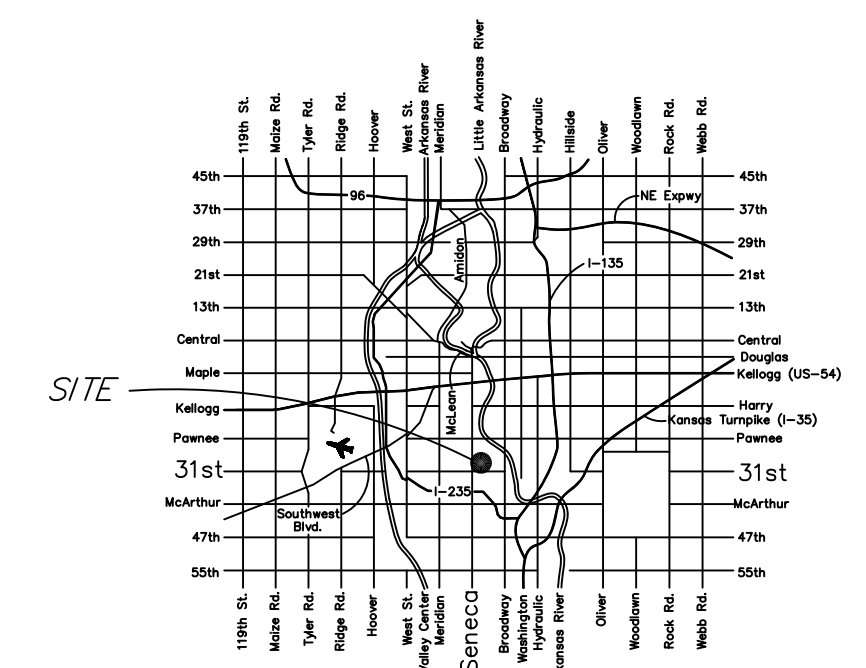
This is to certify that this plat has been filed for record in the Office of the Register of Deeds this day of _____, 2010, at _____ o'clock _____ M, and is duly recorded.

Bill Meek, Register of Deeds

Tonya Buckingham, Deputy

Reviewed in accordance with K.S.A. 58-2005 on this _____ day of _____, 2010.

Tricia L. Robello, L.S. #1246
Deputy County Surveyor
Sedgwick County, Kansas



LOCATION MAP

Filename: 09148 Lewis School Plat.dwg \ Lewis School Prelim Plat.dwg 2-05-2010

Aerial Photograph
Drainage Plan
Preliminary Plat



Seneca St.

Osage Ave.

29th Street South

Proposed Site →

31st Street South



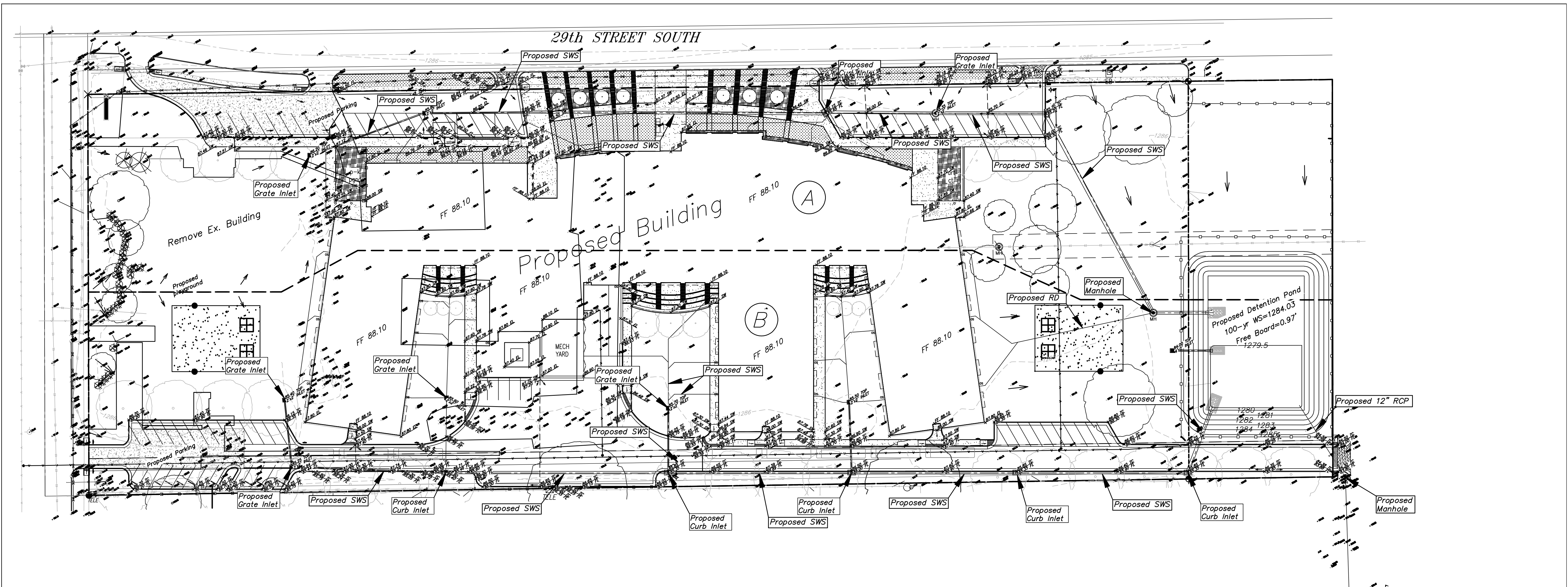
Lewis Magnet School Addition
Aerial Map
 Wichita, Kansas



516 S. Market,
 Wichita, KS 67202

316/264-0242

PROJECT NUMBER			
KEM NO. 09148	FILE aerial	DATE 10/2010	SHEET 1
DESIGN GP	DRAWN GP	REVISED	OF 1



Pre-Developed Condition:
 Total Site Area= 7.63 Acres
 Soil Group B
 Average slope of ground=0.20%

Weighted C for Existing condition		C-Value					
Area Type	Acres	2-yr	5-yr	10-yr	50-yr	100-yr	
Building area	0.77	0.80	0.85	0.90	0.92	0.93	
Finish pvt.	0.65	0.87	0.87	0.88	0.88	0.89	
Playground	0.28	0.33	0.35	0.42	0.51	0.55	
Grass	5.93	0.16	0.18	0.24	0.32	0.37	
Weighted 'C'		0.29	0.31	0.37	0.44	0.48	

Developed Condition:
 Total Site Area= 7.63 Acres
 Building Area= 1.85 Acres
 Parking and other
 Impervious Area= 2.08 Acres
 Grass Area=3.70 Acres

Weighted C for developed condition		C-Value					
Area Type	Acres	2-yr	5-yr	10-yr	50-yr	100-yr	
Building area	1.85	0.80	0.85	0.90	0.92	0.93	
Finish pvt.	2.08	0.87	0.87	0.88	0.88	0.89	
Grass	3.70	0.20	0.22	0.28	0.36	0.41	
Weighted 'C'		0.53	0.55	0.59	0.64	0.67	

Engineer's Note:
 Site drainage calculations developed using the Rational Method for peak runoff. "C" & "I" values established from the City of Wichita Design Criteria and Documentation.

Benchmarks:

- City of Wichita disc on the southwest corner of traffic signal light pole base at the northeast corner of 31st Street South and Seneca. Elevation=1283.22
- 3/4" steel rod in curb @ east end of the southeast return at Osage and 29th Street South. Elevation=1285.75

Pre-Developed Drainage Calculations													
Area #	Acres	Tc min	C2	I2	C5	I5	C10	I10	C50	I50	C100	I100	Remark
Total Site	7.63	75	0.29	1.50	0.31	1.95	0.37	2.31	0.44	3.08	0.48	3.42	Draining in to southeast corner of the property.

Developed Drainage Calculations													
Area #	Acres	Tc min	C2	I2	C5	I5	C10	I10	C50	I50	C100	I100	Remark
A	3.50	22.7	0.53	3.10	0.55	3.73	0.59	4.31	0.64	5.63	0.67	6.13	North portion
B	4.13	17.4	0.53	3.61	0.55	4.31	0.59	4.95	0.64	6.44	0.67	7.00	South portion

Area #	Existing Q, cfs				
	Q2	Q5	Q10	Q50	Q100
Total Site	3.32	4.61	6.52	10.34	12.53

Area #	Proposed Q, cfs					*Qout, cfs					Remark
	Q2	Q5	Q10	Q50	Q100	Q2	Q5	Q10	Q50	Q100	
A	5.75	7.18	8.90	12.61	14.37	3.25	4.11	4.77	5.97	6.47	Detention through 12" RCP
B	7.90	9.79	12.06	17.02	19.37						

Critical Duration for Peak outflow=90 mins

**Lewis Magnet School Addition
 Drainage plan
 Wichita, Kansas**

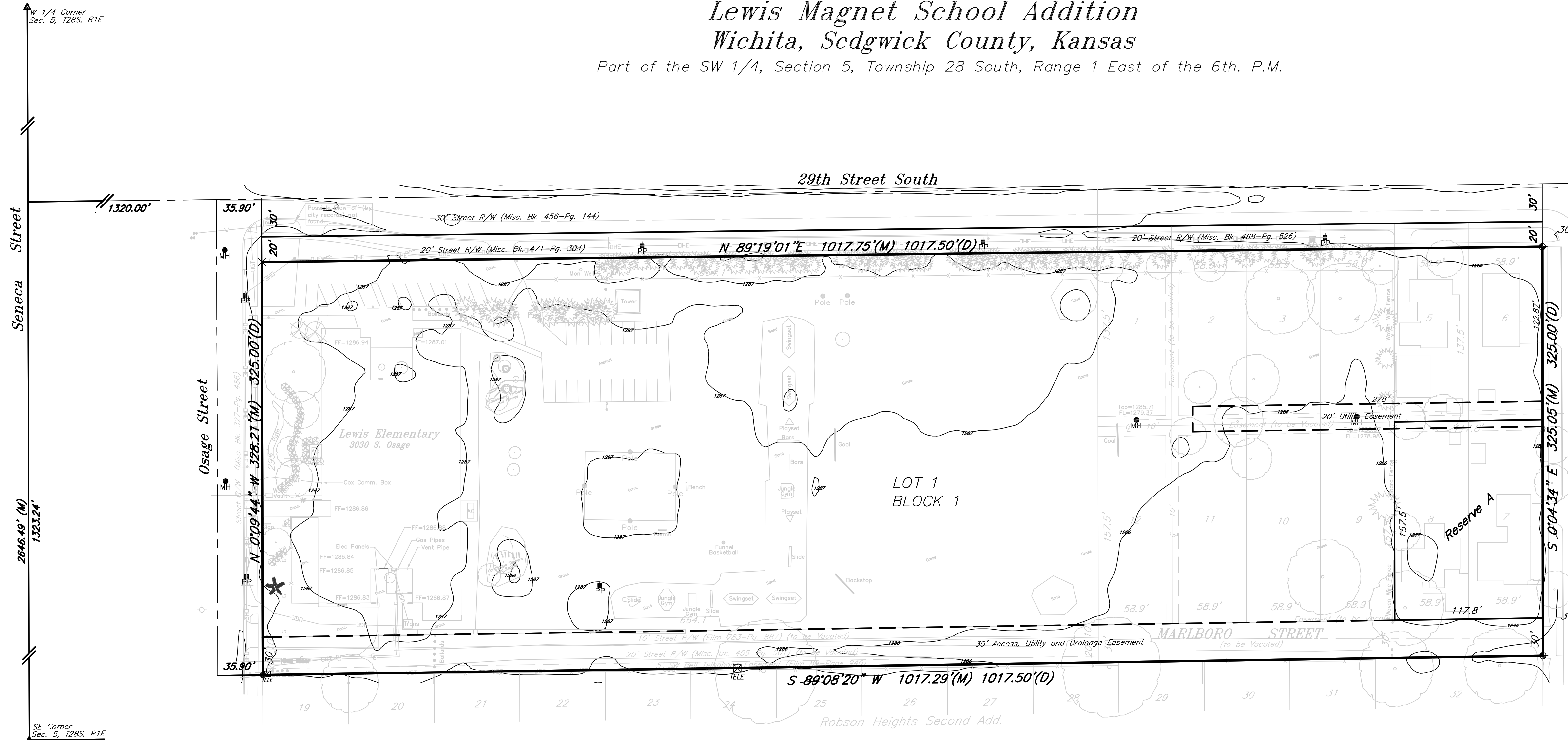
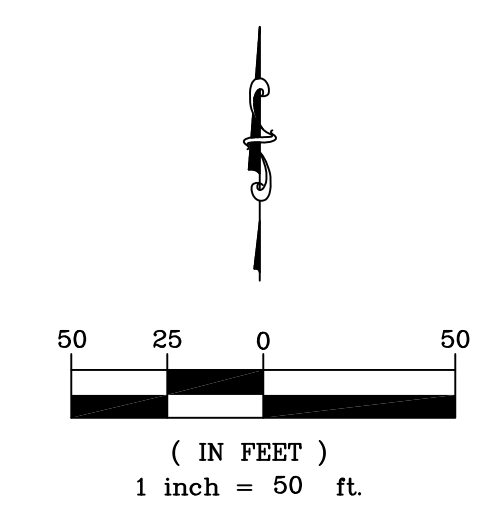
PROJECT NUMBER

kemiller engineering	KEM NO. 09148	FILE drainage	DATE 10/2010	SHEET 1
	DESIGN GP	DRAWN GP	REVISED	OF 1

516 S. Market, Wichita, KS 67202 316/264-0242

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Part of the SW 1/4, Section 5, Township 28 South, Range 1 East of the 6th. P.M.

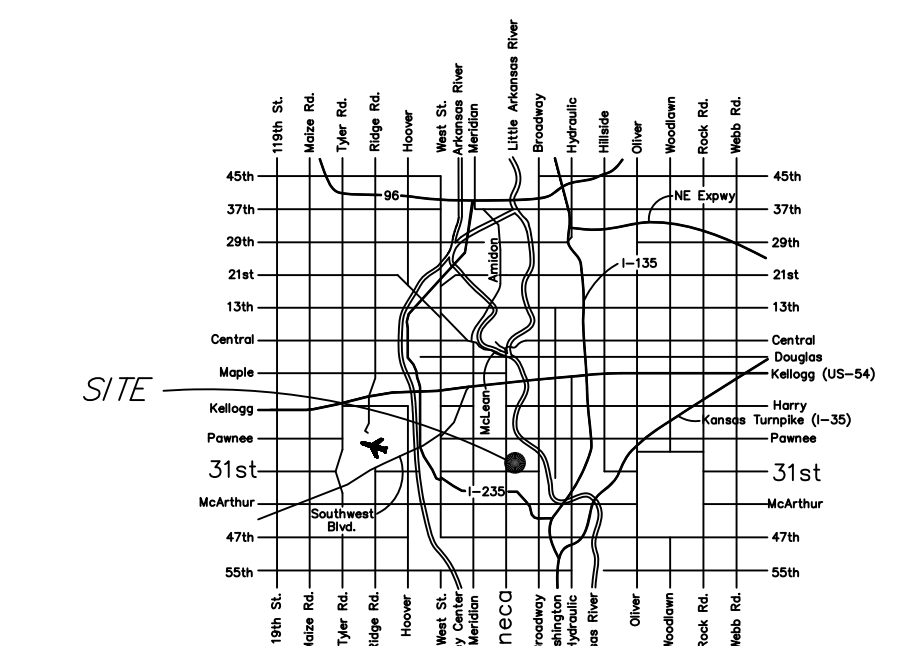


- LEGEND**
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Unified School District #259

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County of Sedgwick } ss

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Notary Public
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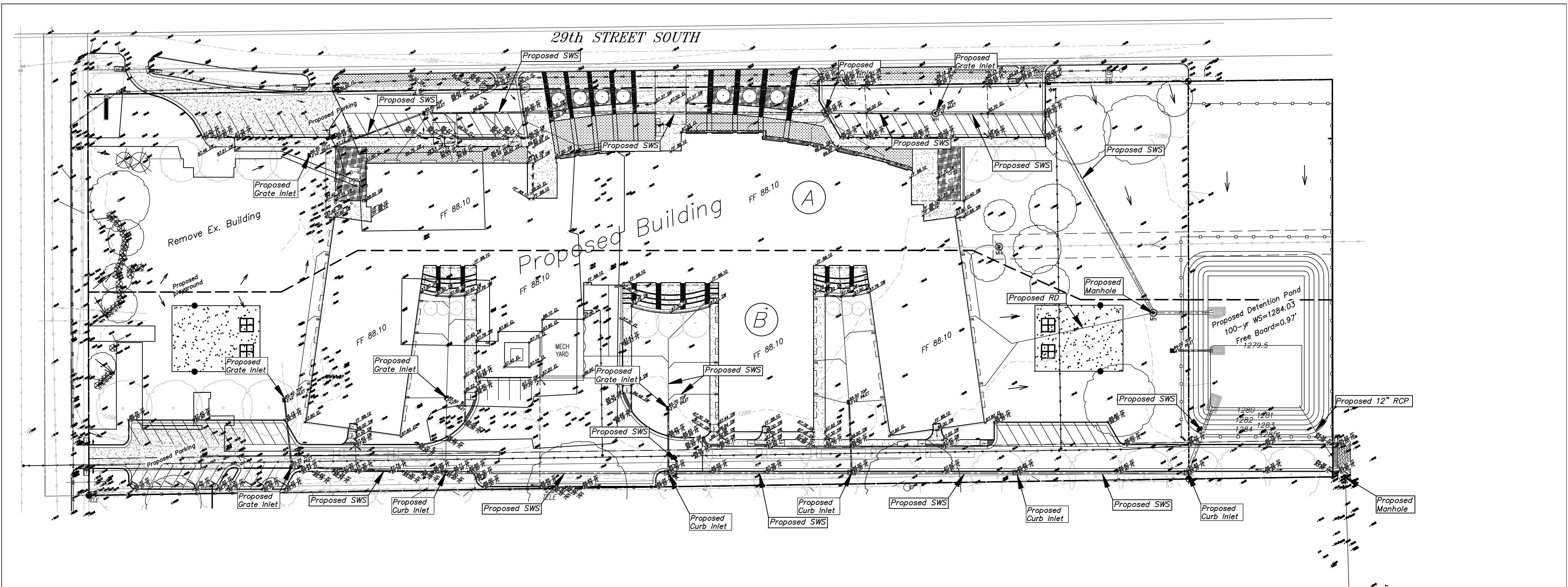
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516 S. Market, Wichita, KS 67202 316/264-0242

Drainage Plan
Erosion Control Plan
Hydrological Analysis



Pre-Developed Condition:
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 Soil Group B
 Average slope of ground=0.20%

Weighted C for Existing condition		C-Value					
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Building area	0.77	0.80	0.85	0.90	0.92	0.93	
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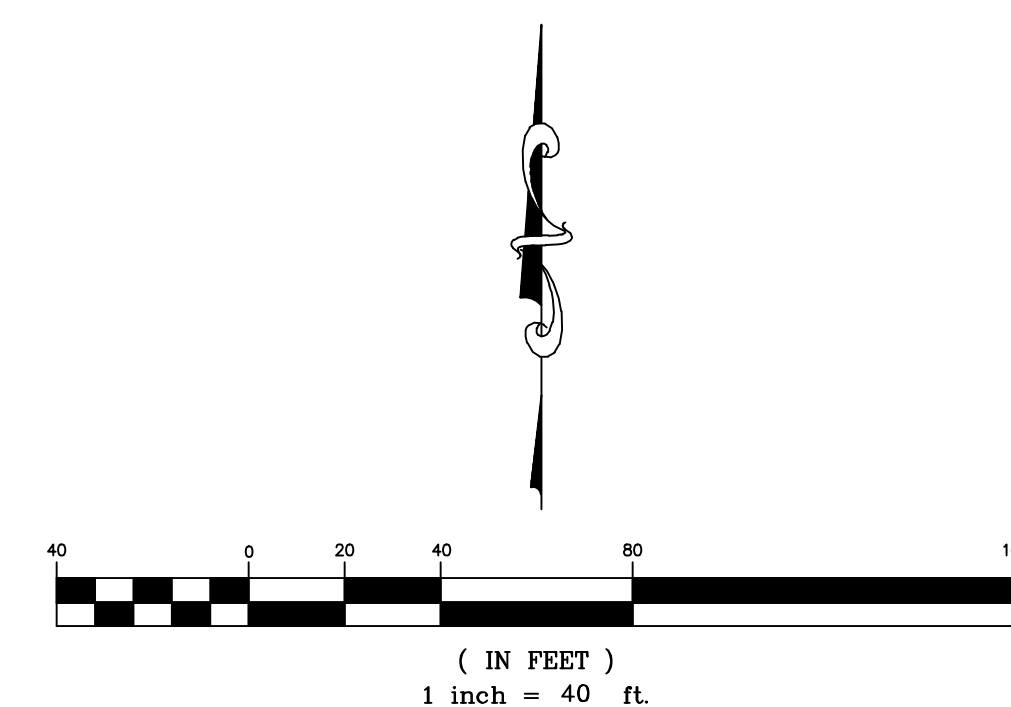
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Critical Duration for Peak outflow=90 mins



**Lewis Magnet School Addition
 Drainage plan
 Wichita, Kansas**

PROJECT NUMBER

kemiller engineering	KEM NO. 09148	FILE drainage	DATE 10/2010	SHEET 1
	DESIGN GP	DRAWN GP	REVISED	OF 1

516 S. Market, Wichita, KS 67202 316/264-0242

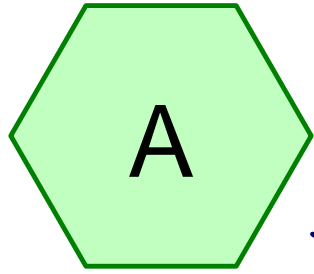
Existing Onsite Runoff Information

Area #	Acres	Land Use	Max Elevation	Min. Elevation	Flow Length (L)	Time of Concentration, Tc (Min)	C-Values				
							2-yr	5-yr	10-yr	50-yr	100-yr
Entire Site (Lewis Magnet Addition)	7.63	Partially Developed for School use	1286.2	1284.5	864' (Mixed flow)	70	0.29	0.31	0.37	0.44	0.48

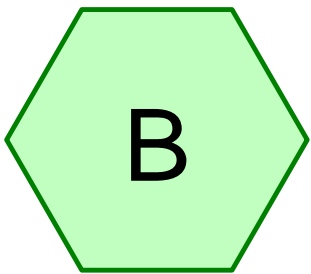
Developed Runoff Information

Area #	Acres	Land Use	Max Elevation	Min. Elevation	Flow Length (L)	Time of Concentration, Tc (Min)	C-Values				
							2-yr	5-yr	10-yr	50-yr	100-yr
A	7.63	School use	1286.5	1279.5	1048' (Mixed flow)	22.7	0.53	0.55	0.59	0.64	0.67
B	7.63	School use	1286.5	1279.5	944' (Mixed flow)	17.4	0.53	0.55	0.59	0.64	0.67

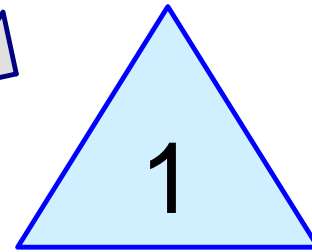
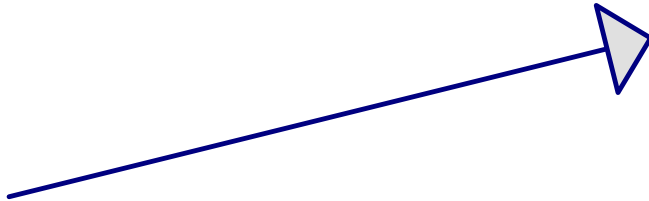
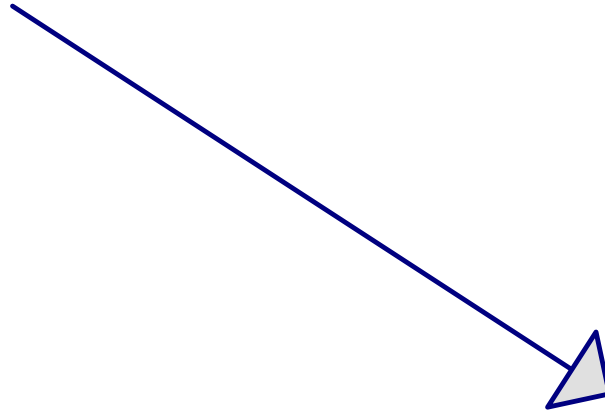
Runoff calculations are shown in Drainage plan.



Area A



Area B



Det. Pond

Summary for Pond 1: Det. Pond

Inflow Area = 7.630 ac, Inflow Depth = 2.83" for 100-Year event
 Inflow = 14.49 cfs @ 0.45 hrs, Volume= 1.796 af
 Outflow = 6.47 cfs @ 1.68 hrs, Volume= 1.676 af, Atten= 55%, Lag= 74.0 min
 Primary = 6.47 cfs @ 1.68 hrs, Volume= 1.676 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-4.95 hrs, dt= 0.15 hrs
 Peak Elev= 1,284.03' @ 1.68 hrs Surf.Area= 15,549 sf Storage= 51,358 cf

Plug-Flow detention time= 84.2 min calculated for 1.626 af (91% of inflow)
 Center-of-Mass det. time= 84.3 min (139.5 - 55.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,279.50'	67,361 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

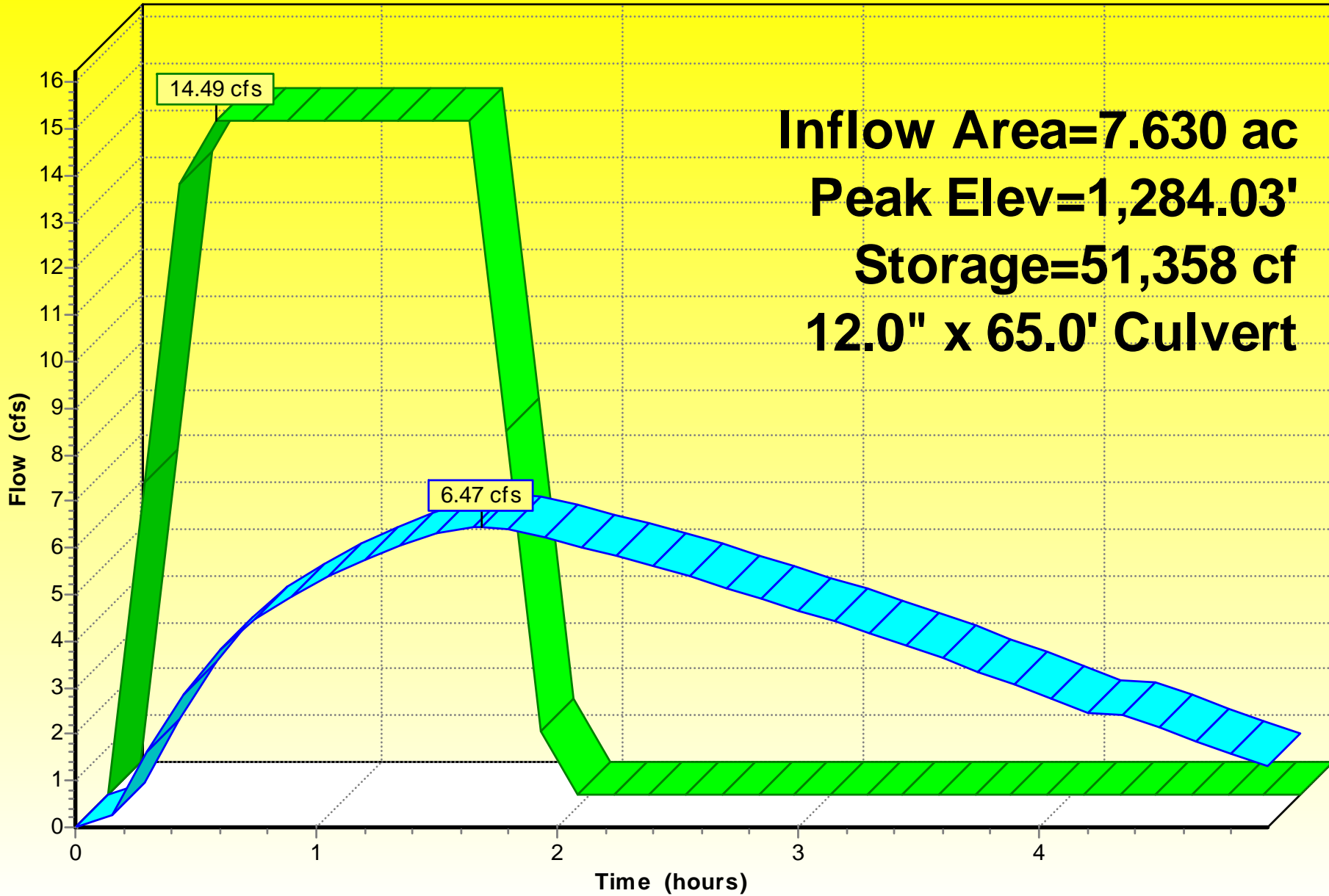
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,279.50	3,802	0	0
1,280.00	8,650	3,113	3,113
1,281.00	10,209	9,430	12,543
1,282.00	11,869	11,039	23,582
1,283.00	13,629	12,749	36,331
1,284.00	15,490	14,560	50,890
1,285.00	17,451	16,471	67,361

Device	Routing	Invert	Outlet Devices
#1	Primary	1,279.50'	12.0" x 65.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,279.30' S= 0.0031 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=6.45 cfs @ 1.68 hrs HW=1,284.01' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 6.45 cfs @ 8.21 fps)

Hydrograph



Inflow
Primary

Inflow Area=7.630 ac
Peak Elev=1,284.03'
Storage=51,358 cf
12.0" x 65.0' Culvert

Summary for Pond 1: Det. Pond

Inflow Area = 7.630 ac, Inflow Depth = 2.43" for 50-Year event
 Inflow = 12.48 cfs @ 0.45 hrs, Volume= 1.547 af
 Outflow = 5.97 cfs @ 1.67 hrs, Volume= 1.458 af, Atten= 52%, Lag= 73.4 min
 Primary = 5.97 cfs @ 1.67 hrs, Volume= 1.458 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-4.95 hrs, dt= 0.15 hrs
 Peak Elev= 1,283.47' @ 1.67 hrs Surf.Area= 14,508 sf Storage= 42,976 cf

Plug-Flow detention time= 82.6 min calculated for 1.458 af (94% of inflow)
 Center-of-Mass det. time= 79.9 min (135.1 - 55.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,279.50'	67,361 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

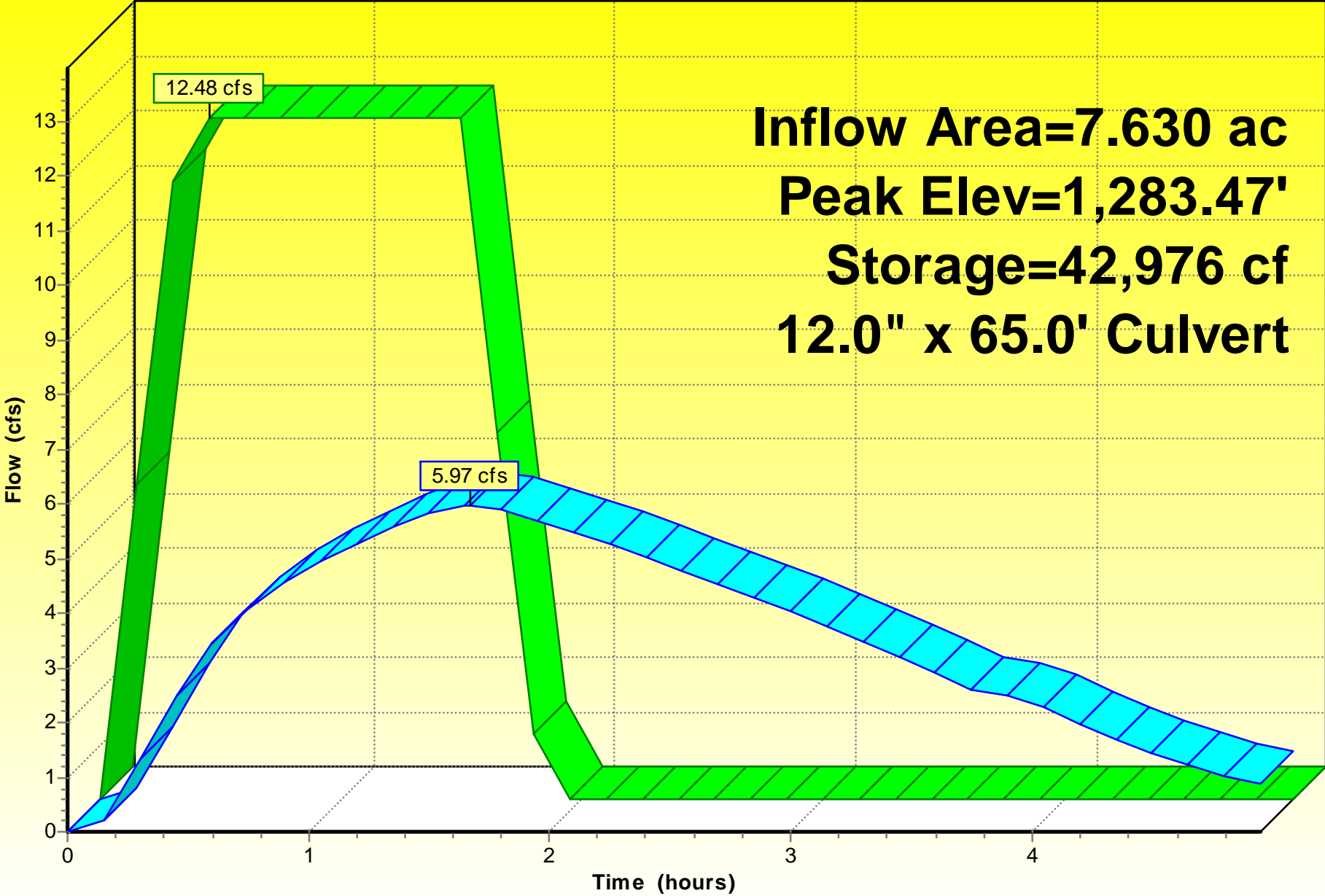
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,279.50	3,802	0	0
1,280.00	8,650	3,113	3,113
1,281.00	10,209	9,430	12,543
1,282.00	11,869	11,039	23,582
1,283.00	13,629	12,749	36,331
1,284.00	15,490	14,560	50,890
1,285.00	17,451	16,471	67,361

Device	Routing	Invert	Outlet Devices
#1	Primary	1,279.50'	12.0" x 65.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,279.30' S= 0.0031 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=5.95 cfs @ 1.67 hrs HW=1,283.46' (Free Discharge)

↑**1=Culvert** (Barrel Controls 5.95 cfs @ 7.58 fps)

Hydrograph



Inflow
Primary

Inflow Area=7.630 ac
Peak Elev=1,283.47'
Storage=42,976 cf
12.0" x 65.0' Culvert

Summary for Pond 1: Det. Pond

Inflow Area = 7.630 ac, Inflow Depth = 1.67" for 10-Year event
 Inflow = 8.58 cfs @ 0.45 hrs, Volume= 1.064 af
 Outflow = 4.77 cfs @ 1.65 hrs, Volume= 1.012 af, Atten= 44%, Lag= 71.9 min
 Primary = 4.77 cfs @ 1.65 hrs, Volume= 1.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-4.95 hrs, dt= 0.15 hrs
 Peak Elev= 1,282.33' @ 1.65 hrs Surf.Area= 12,445 sf Storage= 27,562 cf

Plug-Flow detention time= 72.3 min calculated for 1.012 af (95% of inflow)
 Center-of-Mass det. time= 70.0 min (125.2 - 55.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,279.50'	67,361 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

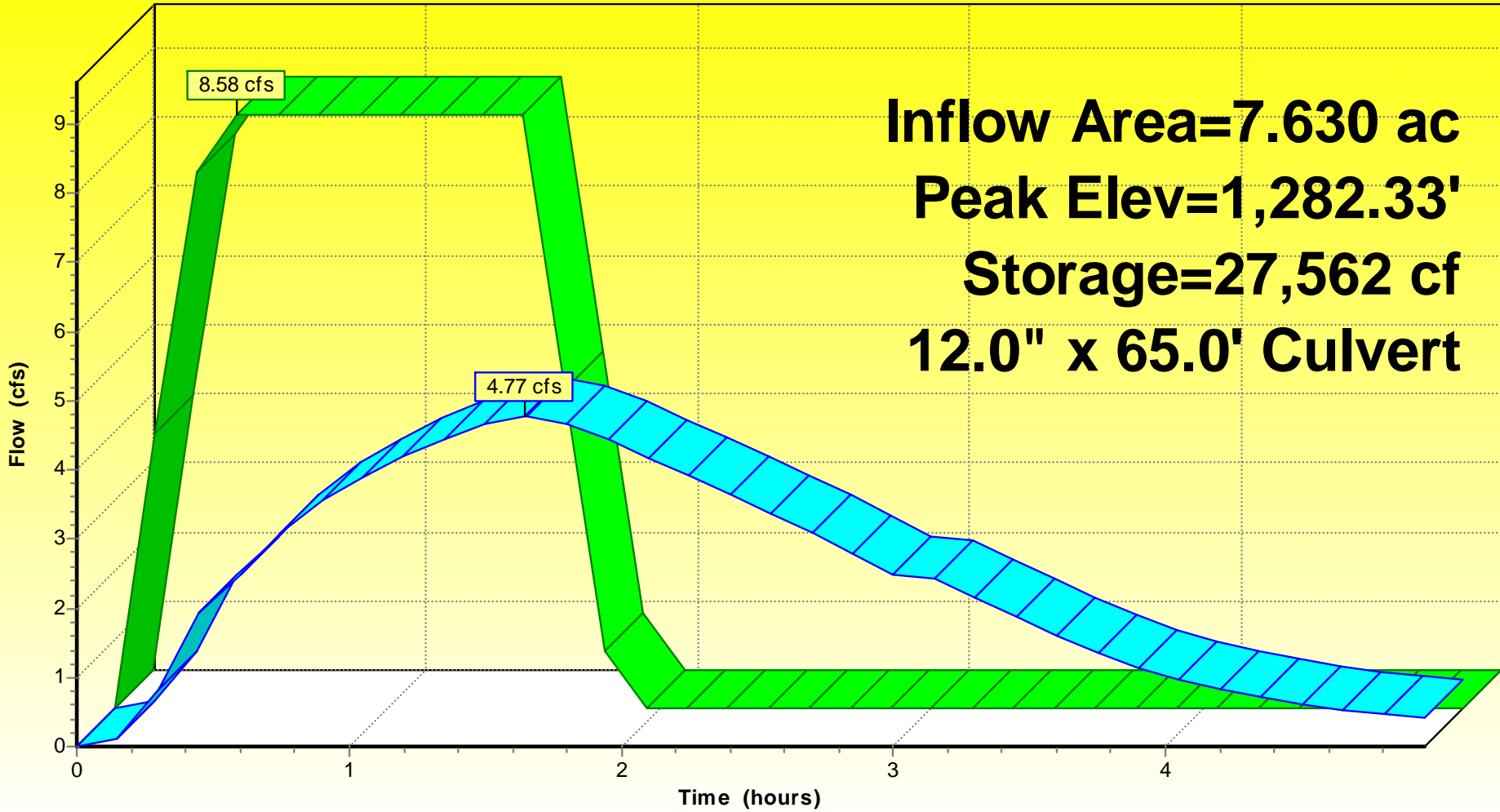
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,279.50	3,802	0	0
1,280.00	8,650	3,113	3,113
1,281.00	10,209	9,430	12,543
1,282.00	11,869	11,039	23,582
1,283.00	13,629	12,749	36,331
1,284.00	15,490	14,560	50,890
1,285.00	17,451	16,471	67,361

Device	Routing	Invert	Outlet Devices
#1	Primary	1,279.50'	12.0" x 65.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,279.30' S= 0.0031 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=4.77 cfs @ 1.65 hrs HW=1,282.33' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 4.77 cfs @ 6.07 fps)

Hydrograph



Inflow
Primary

Inflow Area=7.630 ac
Peak Elev=1,282.33'
Storage=27,562 cf
12.0" x 65.0' Culvert

Summary for Pond 1: Det. Pond

Inflow Area = 7.630 ac, Inflow Depth = 1.34" for 5-Year event
 Inflow = 6.87 cfs @ 0.45 hrs, Volume= 0.852 af
 Outflow = 4.11 cfs @ 1.63 hrs, Volume= 0.811 af, Atten= 40%, Lag= 71.0 min
 Primary = 4.11 cfs @ 1.63 hrs, Volume= 0.811 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-4.95 hrs, dt= 0.15 hrs
 Peak Elev= 1,281.80' @ 1.63 hrs Surf.Area= 11,544 sf Storage= 21,291 cf

Plug-Flow detention time= 67.9 min calculated for 0.811 af (95% of inflow)
 Center-of-Mass det. time= 65.6 min (120.8 - 55.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,279.50'	67,361 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

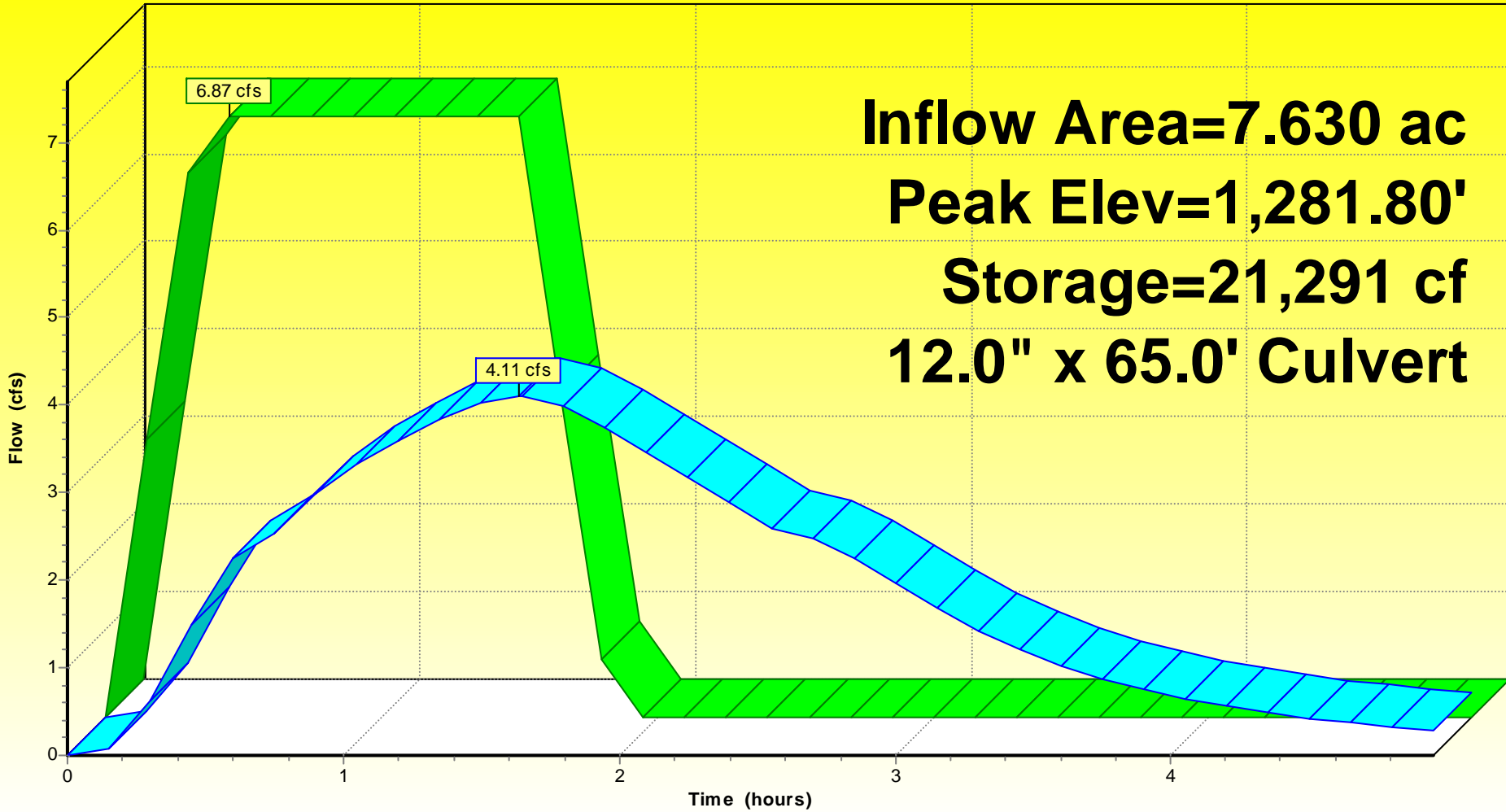
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,279.50	3,802	0	0
1,280.00	8,650	3,113	3,113
1,281.00	10,209	9,430	12,543
1,282.00	11,869	11,039	23,582
1,283.00	13,629	12,749	36,331
1,284.00	15,490	14,560	50,890
1,285.00	17,451	16,471	67,361

Device	Routing	Invert	Outlet Devices
#1	Primary	1,279.50'	12.0" x 65.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,279.30' S= 0.0031 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=4.10 cfs @ 1.63 hrs HW=1,281.80' (Free Discharge)

↑**1=Culvert** (Barrel Controls 4.10 cfs @ 5.22 fps)

Hydrograph



Inflow
Primary

Inflow Area=7.630 ac
Peak Elev=1,281.80'
Storage=21,291 cf
12.0" x 65.0' Culvert

Summary for Pond 1: Det. Pond

Inflow Area = 7.630 ac, Inflow Depth = 0.98" for 2-Year event
 Inflow = 5.04 cfs @ 0.45 hrs, Volume= 0.625 af
 Outflow = 3.25 cfs @ 1.62 hrs, Volume= 0.593 af, Atten= 36%, Lag= 70.1 min
 Primary = 3.25 cfs @ 1.62 hrs, Volume= 0.593 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-4.95 hrs, dt= 0.15 hrs
 Peak Elev= 1,281.24' @ 1.62 hrs Surf.Area= 10,609 sf Storage= 15,049 cf

Plug-Flow detention time= 64.0 min calculated for 0.593 af (95% of inflow)
 Center-of-Mass det. time= 61.5 min (116.7 - 55.2)

Volume	Invert	Avail.Storage	Storage Description
#1	1,279.50'	67,361 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

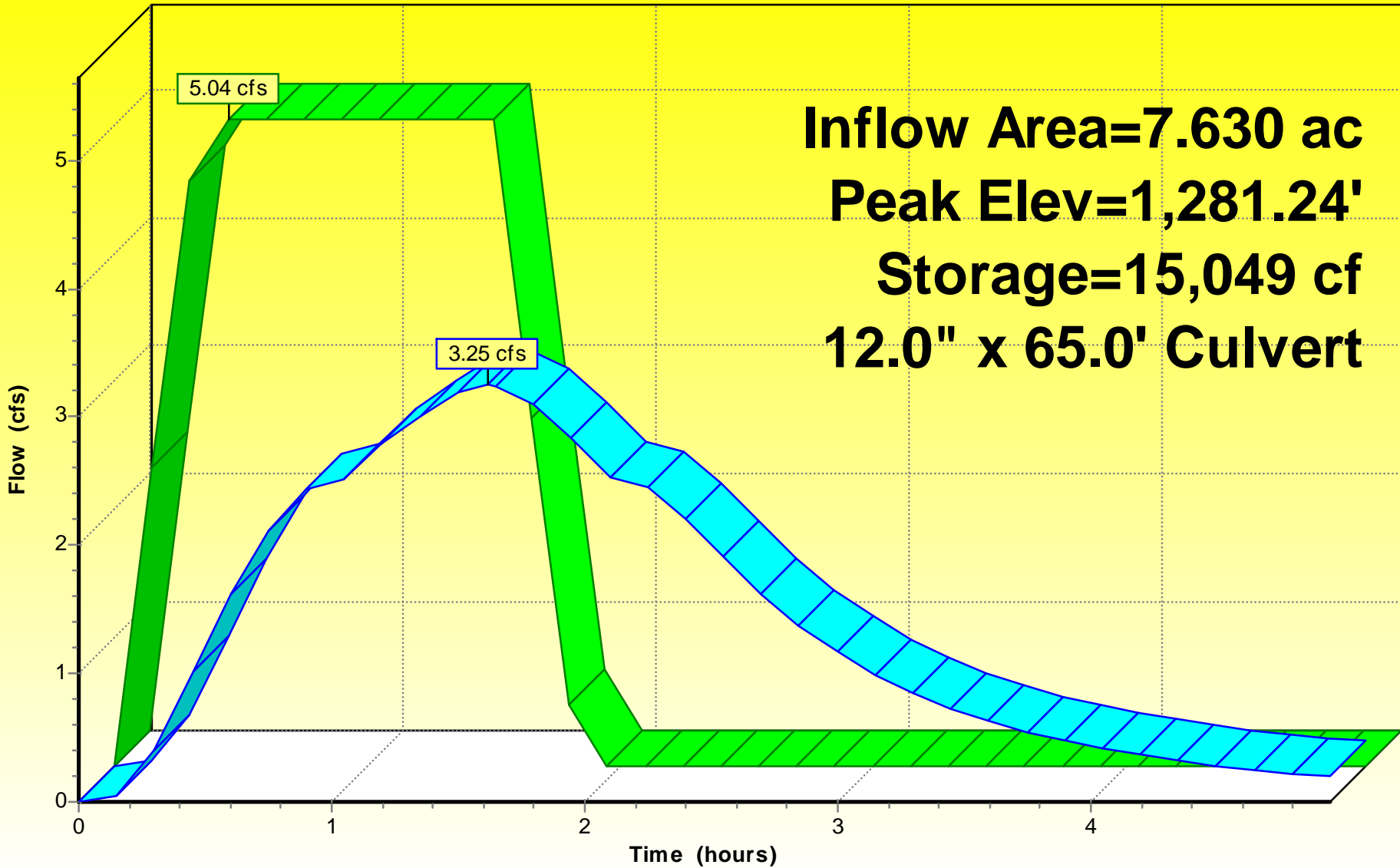
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,279.50	3,802	0	0
1,280.00	8,650	3,113	3,113
1,281.00	10,209	9,430	12,543
1,282.00	11,869	11,039	23,582
1,283.00	13,629	12,749	36,331
1,284.00	15,490	14,560	50,890
1,285.00	17,451	16,471	67,361

Device	Routing	Invert	Outlet Devices
#1	Primary	1,279.50'	12.0" x 65.0' long Culvert RCP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 1,279.30' S= 0.0031 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=3.23 cfs @ 1.62 hrs HW=1,281.23' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.23 cfs @ 4.12 fps)

Hydrograph



Inflow
Primary

Inflow Area=7.630 ac
Peak Elev=1,281.24'
Storage=15,049 cf
12.0" x 65.0' Culvert

Public Works, Eng. Div. Storm water checklist
Electronic copies of Report



Public Works, Engineering Division Stormwater Management Subdivision Submittal Checklist

Reviewer: _____	Date: _____
Subdivision Name: <u>Lewis Magnet Addition</u>	Location: <u>3030 S Osage Ave.</u>
Total Land Area Of Ownership: <u>7.63</u> Acres	
Type: <input checked="" type="checkbox"/> Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other _____	
Applicant: <u>USD 259</u>	Contact: <u>Julie Hedrick</u> Phone #: <u>973-2010</u>
Engineer: <u>K E Miller Eng. PA</u>	Contact: <u>Kirk Miller</u> Phone #: <u>264-0242</u>

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development
(If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant		Engr	
	I	NA	Explanation / Location in Plan	
A. Site Location Map, using USGS Map	X		USGS Map/ Drainage Plan	
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	X		Report/Drainage Plan	
C. Discussion of offsite conditions	X		Report/Drainage Plan	
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	X		Report/Drainage Plan	
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design	X		Report/Erosion Control Plan	
F. Copy of the plat	X		Preliminary Plat/Tab 1	
G. Prelim. four corner lot grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final paving and stormwater drain plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)		X	Drainage Plan	
H. Professional Engineer seal, signature and date on cover of report	X			
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	X			

Tab 2. Existing Conditions Runoff Calculations	Applicant		Engr	
	I	NA	Explanation / Location in Plan	
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	X		Drainage plan/Aerial Map	
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	X		Report/Drainage Plan	
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	X		Drainage Plan	
D. Total Site Area and Total Impervious Area (acres)	X		Drainage Plan	
E. Benchmarks used for site control	X		Drainage Plan	
F. Streams, creeks, and waterway labeled		X		
G. Predominant soils from USDA soil surveys, and/or on site soil borings	X		Report	
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted		X	No Such Features	
I. Location of existing roads, buildings, parking lots and other impervious areas	X		Drainage Plan	



Stormwater Management Subdivision Submittal Checklist

J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	X		Drainage Plan		
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	X		Drainage Plan		
L. Flow paths	X		Drainage Plan		
M. Location and dimensions of existing channels, bridges or culvert crossings		X			
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration	X		Drainage Plan		
O. Assumed pre-developed runoff curve numbers	X		Report/Drainage Plan		
P. Existing time of concentrations used in calculations	X		Report/ Drainage Plan		
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site		X			
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)	X		Report/ Drainage Plan		
S. Cross-section data for open channels		X			
T. Ground water elevations, if applicable		X	Not Required		

Tab 3. Post-Development Hydrologic Analysis	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)	X		Drainage Plan		
B. Proposed time of concentrations used in calculations	X		Drainage Plan		
C. Assumed post-developed runoff curve numbers	X		Drainage Plan		
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)		X			
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration	X		Hydrological Analysis/ Drainage Plan		
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities	X		Hydrological Ana./ Plan		
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary		X			
H. Dam safety analysis, where necessary		X			
I. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)	X		Hydrological Ana./ Plan		
J. Design water surface elevations and normal pool elevation for ponds.	X		Hydrological Ana./ Plan		
K. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.		X			
L. Proposed limits of clearing and grading		X	Includes Entire Site		
M. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	X		Plan		
N. Location of existing and proposed utilities (e.g., water, sewer) and easements	X		Plan		
O. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	X		Drainage Plan		
P. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings		X	No Downstream Improv		



Stormwater Management Subdivision Submittal Checklist

Q. Preliminary selection and location of stormwater controls		X		
R. Emergency overflow structure's flow path		X		
S. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)	X		Hydrological Analysis/ Drainage Plan	
T. The 100-year 24-hour HWL delineated on the plan for detention pond	X		Hydrological Ana./ Plan	
U. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds		X		
V. Stormwater Management Facilities located within a Reserve		X		
W. Maintenance of stormwater management facility specified in the plat as the responsibility of the Homeowner or Business Association		X		
X. Off-site drainage easements or agreements required		X		

	Applicant		Engr	
	I	NA	I	NA
Tab 4. Floodplain Submittal				
A. Provide source of flood profile		X		
B. Nearest base flood elevations		X		
C. Delineation of pre-developed regulatory floodplain/floodway limits		X		
D. Delineation of post-developed regulatory floodplain and floodway limits		X		
E. Floodplain boundary determination per elevation (project limits shown)		X		
F. Provide source of floodway data table and discharges		X		
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions		X		
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		X		
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)		X		
J. Flood plains and floodways located within a Reserve		X		

	Applicant		Engr	
	I/R	NA	I/R	NA
Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)				
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		X		
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		X		
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) CLOMR shall be included and approved for fill placed in the regulatory floodway		X		
D. Kansas Department of Transportation		X		
E. Sedgwick County Right-of-way Permit		X		